

Heating Ventilating Air Conditioning Guide 1949

Pipe, piping (continued)

economical thickness insulation, 591
expansion, 566
fittings, 561
fitting equivalent, 477, 505
flexibility, 566
hangers, 567
heat losses, 579
hot water heating systems, 503
inside dimensions, 562
insulation prevent freezing, 589
leader sizes, 436
low temperature insulation, 583
materials, 561, 982
overhead distribution, 467, 599, 954
refrigerant sizes, 775
sizes, 471, 504
high pressure steam, 479
hot water forced circulation, 515
hot water gravity circulation, 513
indirect heating units, 486
low pressure, 477
maximum velocity, 475, 510
one pipe riser, 478
orifice systems, 471
pressure drop, 478-483, 505
sub-atmospheric systems, 486
tables for, 480
two-pipe riser, 478
two-pipe vapor systems, 484
vacuum systems, 485
water supply systems, 947
steam distribution, 461, 595, 599
steam heating systems, 461
supports, 567
symbols for drawing, 17
tax, 380, 381
thread connections, 567
threads, 567
tunnels, 599
underground insulation, 596
unit heater connections, 462, 553
water supply, 947
Pitot tubes, 95, 200
Plate cell, 846
Plenum absorbers, 845
Plenum chamber, 6
Pneumatic control systems, 663

Pollution of air, 179
Polyphase motors, 678, 685
Ponds, 717
Potentiometer, 6
Power, 6
Precipitators, 650, 657
Pre-cooling, 867
Preheating, 867
Premature infant nurseries, 239

Pressure
absolute, 6
atmospheric, 1
gages, 197
loss, water supply piping, 947
measurement, 197
barometer, 198

Pressure (continued)

regulators, 486, 598, 664
static, 7
taps, 88
total, 7
vapor, 7
velocity, 7
Prime surface (see *Heating Surfaces*), 8
Propeller fan, 631
Protective Coatings, 983
Psychrometer, 7, 53
Psychrometric chart, 226

Pump, pumps
condensate return, 490
mechanical circulators, 503
vacuum heating, 490
controls, 491
piston displacement, 491
Pyrometer, 7, 196
optical, 196
radiation, 196

R

Radial flow fan, 631
Radiant drying, 914

Radiant heating, 615
application methods, 618
calculation principles, 620
control, 629
electric, 620
fundamental computations, 617
hot water, 618
mean radiant temperature, 615
measurement of, 628
objective, 617
operative temperature, 616, 628
steam, 619
warm air, 618
Radiation, 7
baseboard, 521
equation, 106
load, 380
shape factor, 106

Radiator, radiators, 7, 521
baseboard, 521
cages, 524, 991
concealed, 523
connections, 499, 500
correction factor, 525
direct, 7
effect of paint, 526
enclosed, 528
gas-fired, 566
heat emission of, 521
heating effect, 526
heating up, 528
output of, 521
panel, 6
ratings, 524
recessed, 7, 523
tube, 521
types of, 521
warm air, 366

Railway air conditioning, 927
air distribution, 928
air cleaning, 928
humidity control, 930
summer systems, 928
temperature control, 930
ventilation, 928
winter systems, 927
Reciprocating compressors, 766
Recooling, 857
Rectangular duct equivalents, 811
Reducing valves, 486, 598
Reflective insulation, 118, 126

Refrigerant, refrigerants, 7, 747
ammonia, 747, 752
dichlorodifluoromethane, 747, 750
feeds, 534
monochlorodifluoromethane, 751
monofluorotrichloromethane, 754
pipe sizes, 775
water, 761

Refrigeration, 745, 944
absorption systems, 762
air cycle, 760
basic concepts, 745
complex cycles, 759
condensers (see *Condensers*), 769
control, 772
definitions, 745
discharge pressure, 757
equipment selection, 778
expansion valves, 772
float valves, 773
heat pump, 765
ice systems, 764
load, 271
mechanical, 745
piping, 775
reverse cycle, 765
ship, 944
simple cycle, 753
steam jet, 761
suction, 757
symbols for drawing, 17
theory, 745
ton of, 7, 745
types of compressors (see *Compressors*), 766
vapor compression cycle, 753
water jacket, 757
Reign, 888
control of, 889
hygroscopic materials, 890
static, 826

Register, registers, (see *Grilles*), 435, 436, 444, 784
air supply noises, 822, 849
mechanical furnace systems, 443
noises, 850
railway car, 829
selection, 435, 436, 444, 797
Reheat, 860, 869
Reheating, 860, 869
Relative humidity, 5, 66
measurement of, 204
Repulsion induction motors, 689

Index to Technical Data Section

Resistance
control systems, 666
air conditioning, 663
coal-fired heating plant, 666
domestic hot water supply, 961
cooling methods, 459
gravity furnace systems, 433
heat loss problems, 266
hot water heating system, 503
mechanical furnace system, 443
steam heating system, 461
Resistance thermometers, 196
Resistors, 607
Return
grille, 435, 437
main, 8, 461, 480, 483, 508
openings, 435, 446, 803
Reverse cycle refrigeration, 765, 766
Reversed return system, 8, 510

Roof, roofs
heat flow through, 139-142, 288-299
time lag of solar radiation, 287, 291
ventilators, 174

Room
air motion, 783, 793
control, 664
cross transmission noise, 851
latent heat, 861
noise level, 840
operating, 238
sensible heat, 861
Rotary dryer, 916
Rotary oil burner, 358
Run-around system, 868

S

Saturated air, 1, 49
Saturation, 8
degree of, 8, 49
pressure, 7
Scale, 965
cause and prevention, 965, 969
closed systems, 971
heating systems, 972
high temperature, 972
open systems, 972
Secondary air, 335, 366, 367
Sectional boiler, 373
Self-contained
control systems, 663
humidifiers, 559
unit conditioner, 697
Sensible cooling, 867
Sensible heat, 271, 280, 312, 316, 321, 861, 872
factor, 861
gain, 271, 309, 312, 315
loss, 283
Sheet metal gages, 826

Ship air conditioning (see *Marine*), 937
heating, 838
ventilation, 939

Ship air conditioning (continued)
Shunt wound motors, 680
Silica gel, 735, 737
Silicon dioxide, 737
Single phase motors, 678, 689
Slime, 973
cause and prevention, 973
formers, 967
Slotted outlets, 786
Sludge, 965
cause and prevention, 969
Smoke, 8, 179
abatement, 183, 341
density measurements, 209
Smokeless arch, 8
Smokeless combustion, 183, 341

Solar heat, 280
absorbed by glass, 301
altitude, 281
through shaded windows, 304, 306
time lag, 287
transmission of, 280
through glass, 294, 298, 299
through roofs, 292
through walls, 292
Solar constant, 8, 281
Solar radiation, 281
absorption of, 281
Solar water heater, 962
Sol-Air temperature, 284
Soot, 346
Sorbents, 735
absorbents, 740
adsorbents, 735

Sound (see *Noise*), 837
absorbers, 843
attenuation, 842
control, 838
cross transmission between rooms, 851
general problem, 838
duct absorbers, 843
isolation, 701
levels, 733, 840
outlet absorbers, 847
Space heaters, 393
Specific
enthalpy, 4, 23, 35, 71, 72
dry air, 35, 52
entropy, 4, 24
gravity, 5
heat, 5
volume, 10
air, 35
water vapor, 36
Split system, 8
Splitter dampers, 800

Spray
apparatus, 709
booths, 902
cooling, 717
cooling ponds, 717
cooling towers, 719
dehumidifier, 713
distribution, 715
dryer, 917
equipment, 709
generation, 709, 715
humidifiers, 711, 716
unit air conditioner, 701
Spread, air distribution, 791
Square foot of heating surface, 8

Squeeze dampers, 445, 800
Squirrel-cage induction motor, 678, 690

Stack, stacks, 173, 399, 433, 446
height, 8
wall, 433, 446
smoke, 399

Standard, standards, 987
air distribution, 783
atmosphere, 70
Standard air, 1
Static
electricity elimination, 892
pressure, 7
Steady flow, energy equation, 70
enthalpy, 4, 23, 69
gravitational energy, 69
heat and shaft work, 69
kinetic energy, 68

Steam, 8
coils, 531
distribution piping, 595
estimating consumption, 417, 423, 603
flow, 473
flow measurement, 90
heated equipment, 313
heating systems, 461
condensate return, 461
connections to units, 500
control valves, 501
corrosion, 972
gravity one-pipe air-vent, 463
gravity return, 461
high pressure steam, 465
mechanical return, 462
one-pipe vapor, 464
orifice, 470
piping for, 461
sub-atmospheric, 469
two-pipe vapor, 466
vacuum, 468
jet type of compressor, 761
meters, 601
panel heating, 615
pipe capacities, 476, 478-483, 947
properties, 36, 48
radiant heating, 615
rates, 603
reducing valves, 486
requirements, 428, 603
runout, 463
superheated, 8
table, 36, 48
traps, 492
Steel boilers, 374, 376
Sterilization of air, 235

Stoker, stokers 349
classification of, 349
combustion adjustments, 354
combustion process, 351
controls, 357, 666
furnace design, 355
mechanical, 349
overfeed flat grate, 351
overfeed inclined grate, 351
sizing and ratings, 356
underfeed, 350